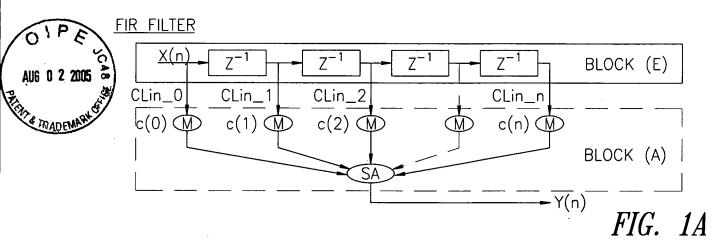
Serial No. 09/807,500 Docket No. 851663.422USPC Inventor(s): Rakesh Malik et al. Express Mail No. EV530945820US "REPLACEMENT SHEET"



IIR FILTER

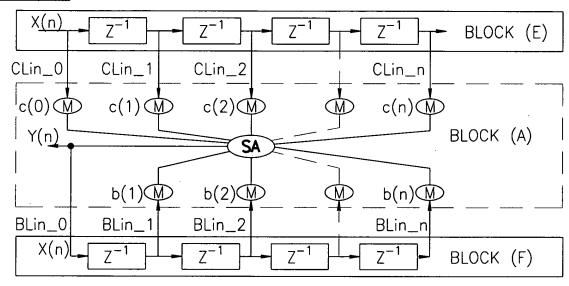


FIG. 1B

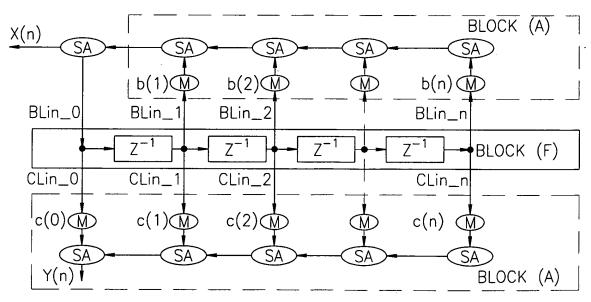
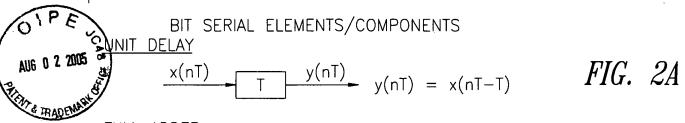


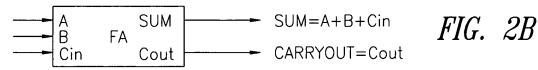
FIG. 1C

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FULL SUBTRACTOR

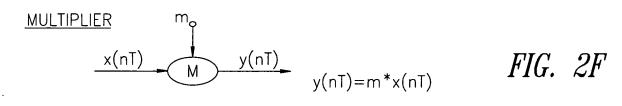


SERIAL ADDER

$$\frac{x_1(nt)}{x_2(nT)}$$
 SA $y(nT)$ $y(nT)=x_1(nT)+x_2(nT)$ FIG. 2D

SERIAL SUBTRACTOR

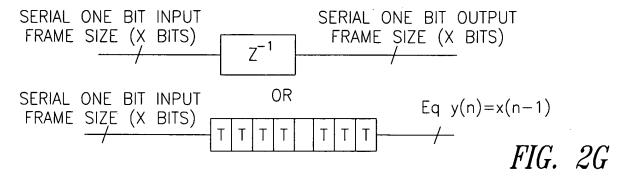
$$\frac{x_1 \text{ (nt)}}{x_2 \text{ (nT)}} \text{ SS} y(\text{nT}) y(\text{nT}) y(\text{nT}) = x_1 \text{ (nT)} - x_2 \text{ (nT)} FIG. 2E$$



<u>DELAY</u>

INPUT FRAME SIZE = X BITS (E.G INPUT IS 1010101 OR X=7 BITS)

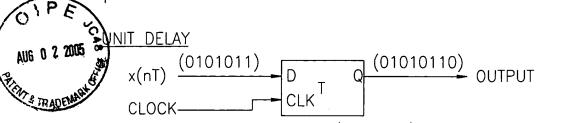
TO STORE X BIT FRAME, NUMBER OF T ELEMENT USED IN X OR 7 IN PRESENT CASE



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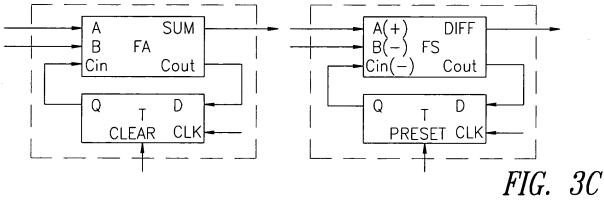
INPUT FRAME INPUT PATTERN (0101011) IS COMING SERIALLY AT x(nt) PIN AT CLOCK RATE SPECIFIED ON CLOCK PIN

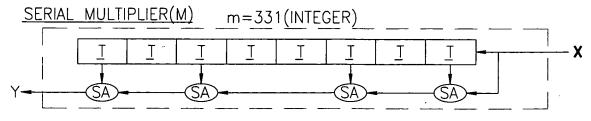
FULL ADDER (FA) / FULL SUBTRACTOR (FS)

BINARY ADDITION/SUBTRACTION COMPONENTS IS REALIZED USING FOLLOWING TRUTH TABLE

TRUTH	TA	BLE-	FULL	ADDER)	TRUTH	TAB	LE-F	FULL	SUBT	RACTOR	
Α	В	Cin	Z	Со		Α	В	Cin	Z	Со		
0	0	0	0	0		0	0	0	0	0		
0	0	1	1	0		0	0	1	1	1		
0	1	0	. 1	0		0	1	0	1	1		
0	1	1	0	1		0	1	1	0	1		
1	0	0	1	0		1	0	0	1	0		
1	0	1	0	1	•	1	0	1	0	0		
1	1	0	0	1		1	1	0	0	0	537 6	
1	1	1	1	[.] 1		1	1	1	1	1	FIG.	<i>3B</i>







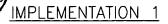
BIT MULTIPLIER COEFFICIENT SIZE IN THIS EXAMPLE IS 331 (BINARY 101001011)

FIG. 3D

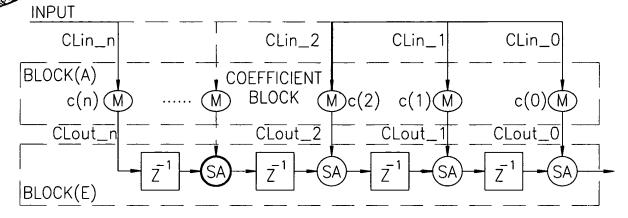
FIG. 3A

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REALIZATION OF COEFFICIENT USING SHARE-ABLE MULTIPLIER (COEFF.=3.11)

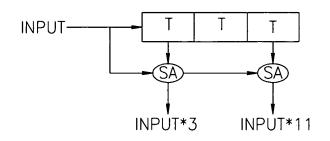
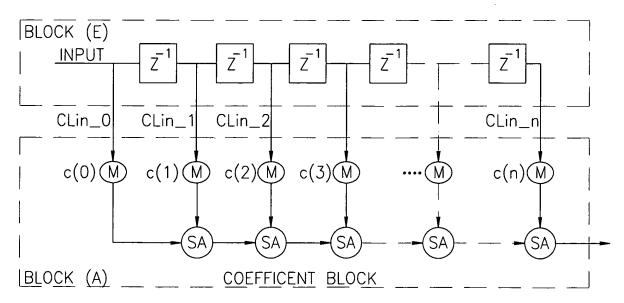


FIG. 4A

IMPLEMENTATION 2



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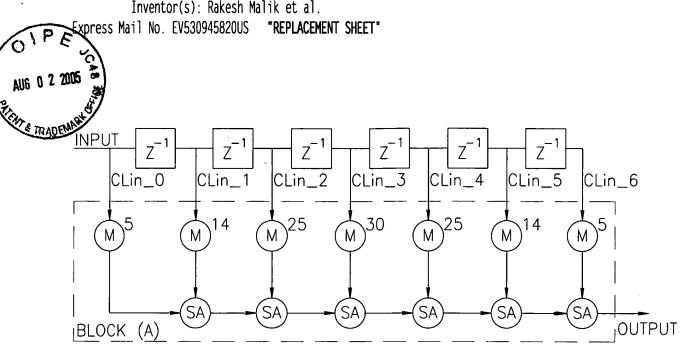
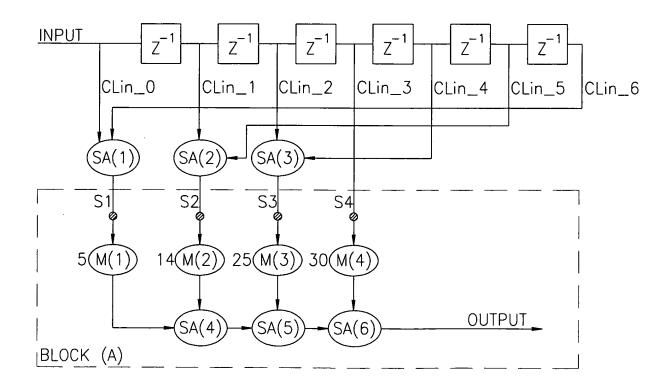


FIG. 5 PRIOR ART



PRIOR ART

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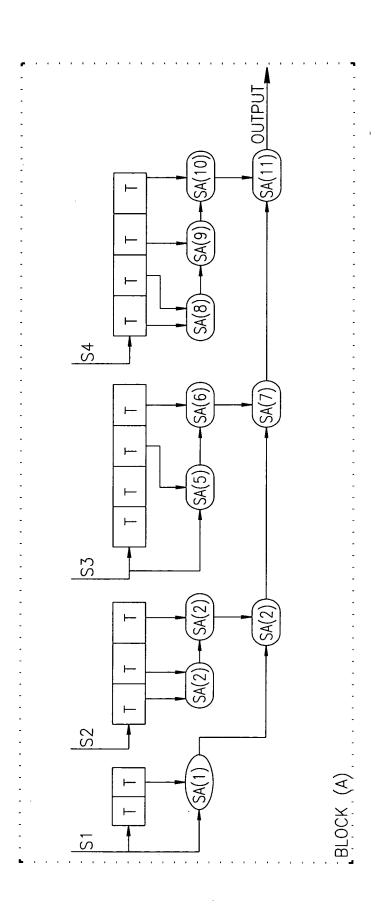
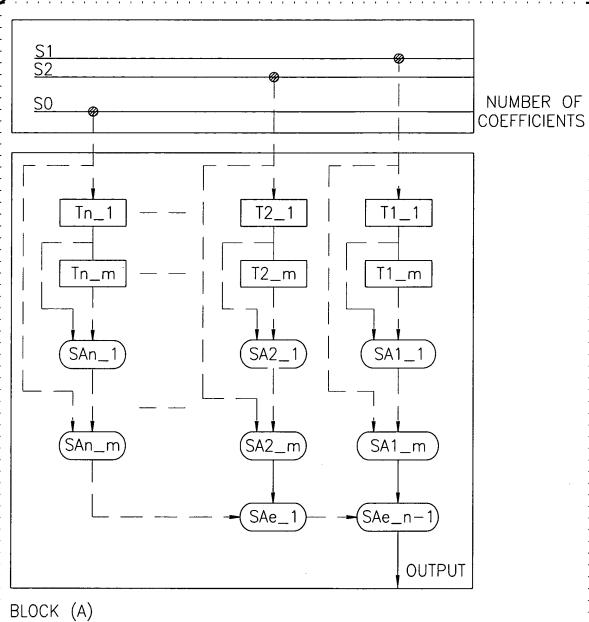


FIG. %

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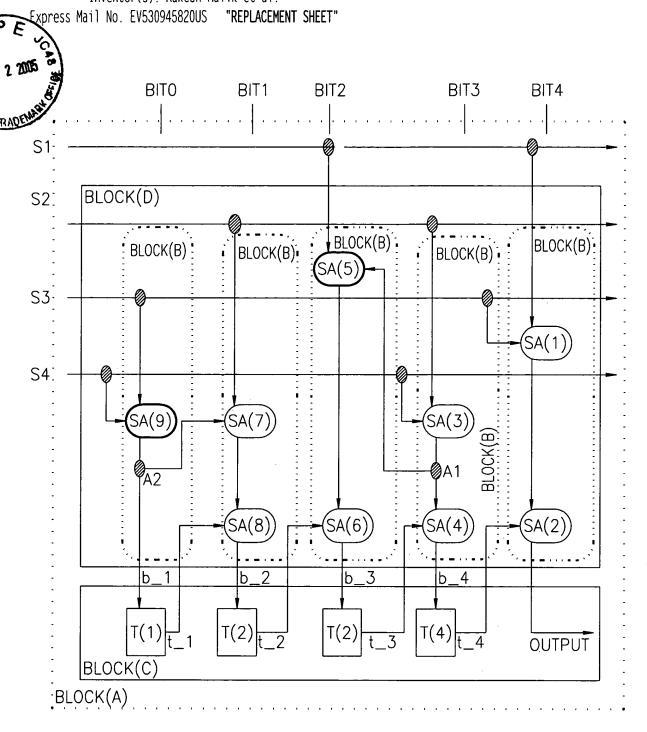
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A) APPROX. NUMBER OF SA = NUMBER OF COEFFICIENT * (MAX COEFF SIZE /2)

B) FLIP-FLOP (T) ARE NOT SHARABLE APPROX. NUMBER OF FLIP-FLOPS — NUMBER OF COEFF * (MAX. COEFFICIENT SIZE /2)

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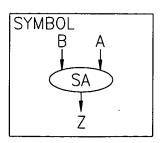


FIG. 9

Serial No. 09/807.500 Docket No. 851663.422USPC Inventor(s): Rakesh Malik et al. P Express Mail No. EV530945820US "REPLACEMENT SHEET" AUG 0 2 2005 STEAT & TRADE 21 BIT 2^m20 **POSITIONS** BLOCK(A) BIT1 BITO BITm <u>S1</u> S1-Sn=NUMBER OF S2 COEFFICIENTS <u>Sn</u> COMBINATIONAL BLOCK(D -SEQUENTIAL BLOCK(D) (SAO_1) SAm_1 (SAm_1) (SAm-1_1) (am*S1+bm*S2++km*sr BLOCK(B): BLOCK(B): BLOCK(B) BLOCK(B) (am*S1+b1*S2+.....+k1*sn) (a0*S1+b0*S2+.....+k0*sn) TERMS (SA1_n REPRESENTING $\sqrt{SAm-1}$ (SA0_n (SAm_r **ADDITION** b_1 b_m b_2 **OUTPUT** T(2)T(m)T(1)T REPRESENTING

APPROX. NUMBER OF SERIAL ADDERS = (NUMBER OF COEFFICIENT MAX COEFF SIZE /2)

NUMBER OF FLIP - FLOPS(I) = SIZE OF MAXIMUM COEFFICIENT

t_m

BLOCK(C)

MULTIPLICATION BY 2

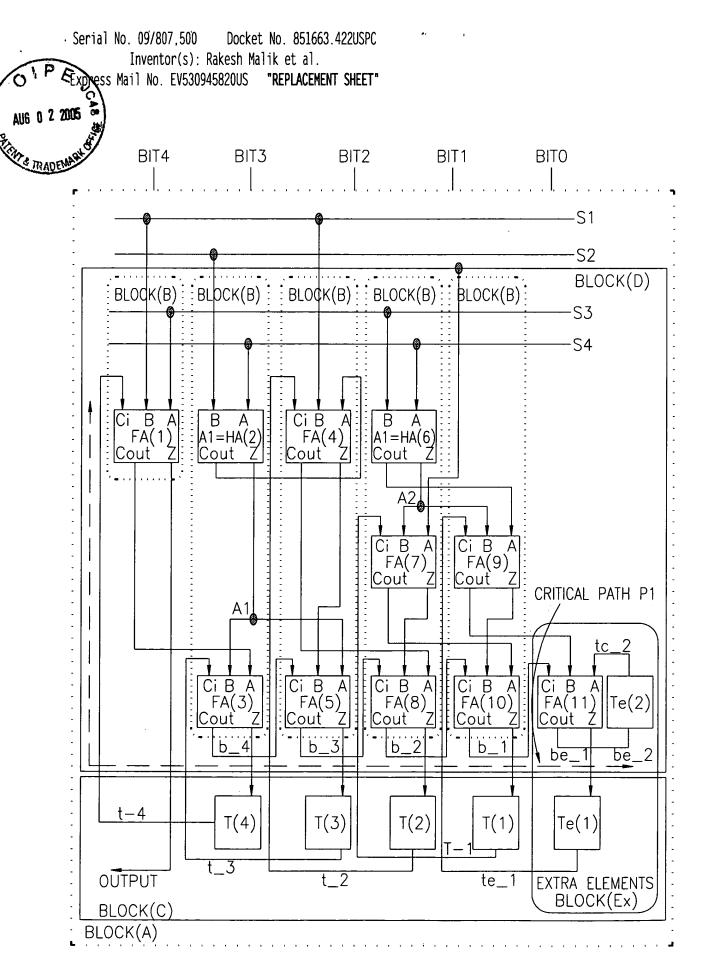
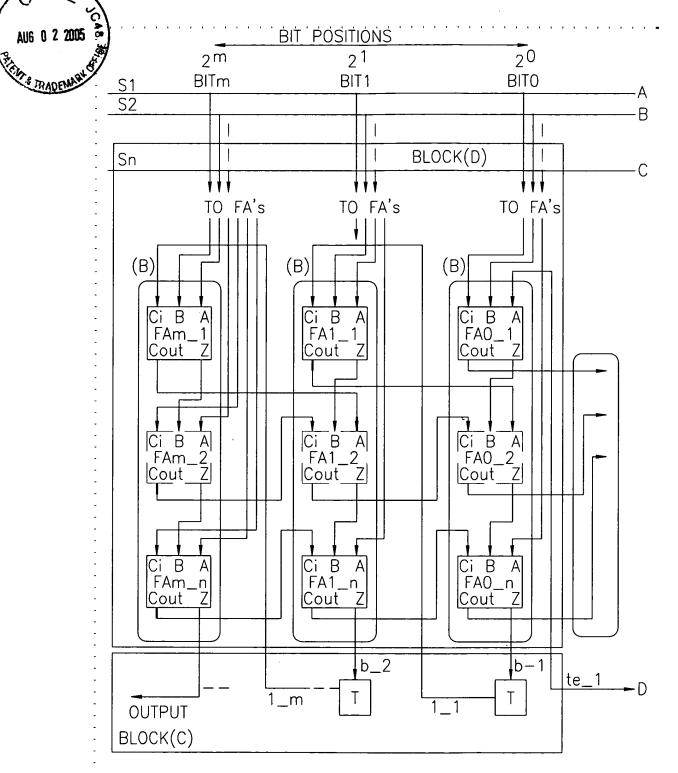


FIG. 11

• Serial No. 09/807,500 Docket No. 851663.422USPC Inventor(s): Rakesh Malik et al.

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NUMBER OF FLIP-FLOPS = MAXIMUM SIZE OF COEFFICIENT NUMBER OD ADDERS = <NUM. OF COEFF MAXIMUM COEFF. SIXE /2

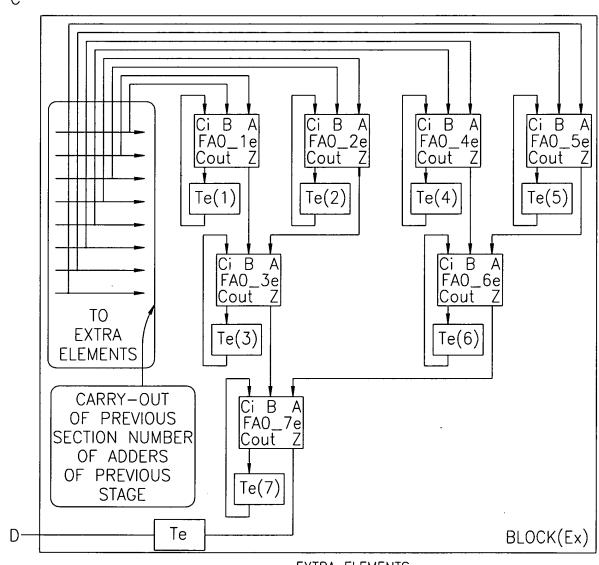
BLOCK(A)

· Serial No. 09/807,500 Docket No. 851663.422USPC

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Inventor(s): Rakesh Malik et al.

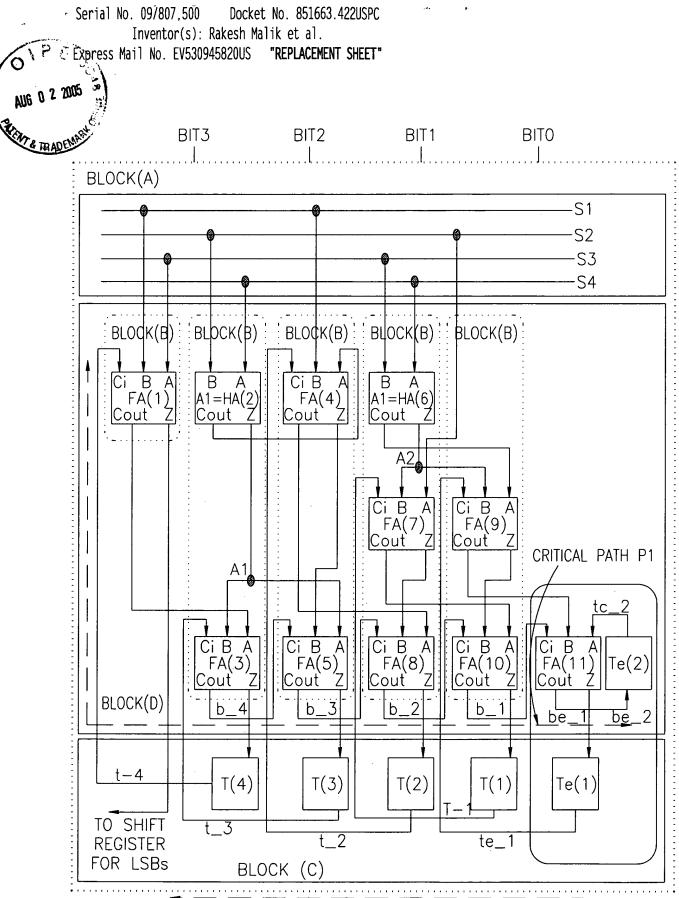
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EXTRA ELEMENTS

NUMBER OF T- ELEMENTS = NUMBER OF ADDERS OF LAST STAGE NUMBER OD FA- ELEMENTS = NUMBER OF ADDERS OF LAST STAGE-1 AN EXAMPLE II NUMB. OF ADDERS IN PREVIOUS STAGE - B, NUMBER OF T-ELEMENTS, FA-ELEMENTS = 8, 7 RESPECTIVELY.

BLOCK(A)



MSBs OF THE RESULT CAN BE GOT FROM HERE

FIG. 13